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A STUDY OF THE STATUS OF CERTAIN ISLAND FORMS OF THE GENUS *SALPINCTES*

By H. S. SWARTH

(Contribution from the Museum of Vertebrate Zoology of the University of California)

OF SCARCELY less interest than those susceptible types of animals which, covering a vast expanse of territory, show wide variation in response to the difference in surroundings at different points, are the forms occasionally observed, just as wide ranging, and over a similarly varied region, but still remaining uniform in appearance over most or all of their habitat. Perhaps as striking an example of the latter class as exists in North America is the Rock Wren (*Salpinctes obsoletus*), the unyielding nature of whose characteristics is in strong contrast to the adaptability shown by other members of the same family of somewhat similar distribution, *Thyromanes* for instance.

The present study, begun by the writer partly at the instance of Mr. Grinnell, to ascertain, if possible, the true status of certain series from the Santa Barbara Islands, is based mainly upon the collection of *Salpinctes* contained in the Museum of Vertebrate Zoology of the University of California. In addition to these specimens there were available the series from the Grinnell, Morcom, and Swarth collections, on deposit in the same institution; and also the collections of F. S. Daggett, and of George Willett, in the Los Angeles Museum of History, Science, and Art. The Grinnell, Daggett, and Willett collections contain large suites of skins from the Santa Barbara Islands. Of exceptional value and interest is a series of twenty-five skins kindly loaned me by Mr. John E. Thayer, containing birds from certain of the islands, including topotypes of *S. obsoletus pulverius* in newly acquired autumnal plumage. Much of the other island material available consists of spring and summer specimens, more or less worn and faded, and these fresh fall specimens give opportunity for comparisons not possible before. I wish here to express my appreciation and gratitude to those persons concerned for the privilege of assembling and studying the material from the above mentioned collections.

Perhaps the one feature brought most strongly to the writer's attention is, as mentioned above, the indifference shown by the species *Salpinctes obsoletus* to conditions forming absolute barriers to many other animals. It is true that our knowledge of the genus *Salpinctes* is rather unevenly distributed. By the latest authority on the group (Ridgway, 1904, pp. 643-653) it is regarded as composed of four species, one of these being divided into six subspecies, three mainland and three island forms. Of all these divisions of the genus, one subspecies, *S. obsoletus obsoletus*, is fairly well known, while it is probably safe to say that none of the others is thoroughly understood. It is evident, however, that taking the distribution of the genus as a whole, extending from Central America over western North America to southern Canada, it is only at the southern limits of the range that there is any tendency toward a separation into well differentiated forms. Here, in a relatively restricted and unvaried portion of America, occur four recognizable forms, as contrasted with the one (*S. obsoletus obsoletus*) ranging over that part of the North American mainland which comprises about three-fourths of the habitat of the entire genus.

Study of the range of the North American Rock Wren (*S. o. obsoletus*)

reveals such an utter disregard of practically all of the various barriers serving as checks to most other animals, that one is rather at a loss to distinguish the factor or factors that finally limit its dispersal. Temperature and humidity, usually of prime importance, seem here, at first glance at least, to be without their customary potency. Rock Wrens are found from the floor of the hottest desert to the summit of the coldest mountain top; while as strong a contrast is afforded by the aridity of these same deserts compared with the various islands on which the wrens are also abundant. The infinite variety of environment which throughout western North America has produced such marked results upon many of the animals of the region, is without visible effect upon this unyielding organism, although over much of the country the birds are evidently non-migratory, a habit of life generally favorable to the production of variations. However, there is probable significance in the fact that the eastern limit of the Rock Wren in North America approximately corresponds with the eastern boundaries of the arid division of the Austral Zones, the main habitat of the species; so that it seems safe to say that it is the increasing humidity eastwards that finally acts as a check in this direction. The assumption is borne out by the fact that there is no marked change in the topography of the country at this point. The species covers a part of the Great Plains region but does not extend over the whole of it.

In local distribution, however, it seems apparent that features of environment other than the variations in temperature or humidity encountered determine the boundaries. The relatively great difference in humidity between the Colorado Desert and the Pacific slope of southern California, for example, obviously is of no effect. The feature essential to the presence of the Rock Wren is open, unforested country. Furthermore, open plains, uniformly grass-covered, will not answer. There must be areas of bare rock, the steep walls of gulches or creeks, precipitous cliffs, or other similar surroundings. These provided, and there evidently are not in the part of North America occupied by this bird, variations of temperature or humidity, from valley to mountain, or from desert to ocean, sufficient either to check its distribution or to obviously modify its appearance.

Though the species is found over so much of western North America, it is useless to look for it amid forested country, and it is not frequently found in even moderately dense chaparral. Its northward dispersal along the Pacific coast is evidently stopped by the forests of the region.

The islands off the coast of California and Lower California offer, in their barren and generally unforested condition, surroundings evidently highly favorable to the Rock Wren, and the species has found its way to every one. Here, if anywhere, it would seem that variations from the general type should appear, for the birds are isolated on each of the islands, while the species is flourishing on all of them. This isolation in most cases, however, has had so far hardly any perceptible effect, and while there is apparently a slight general tendency of island birds toward the development of at least one feature, there are specimens at hand from each of the California islands which are not to be distinguished with certainty from the mainland form.

Some years ago an insular form was described by Grinnell (1898, p. 238), *Salpinctes obsoletus pulverius*, from San Nicolas Island. Its habitat was regarded as confined to San Nicolas Island, but in a later publication the describer (Grinnell, 1902, p. 68) extended its range to San Clemente Island also. This race was founded upon characters of structure and coloration, and

though at least one writer (Willett, 1912, p. 101) has questioned its distinctness, it has received quite general recognition as a valid race. The subspecies was described from very worn adults, collected in May, no birds in fresh autumnal plumage being available. This want has now been filled by the loan of four September specimens from the Thayer collection, and I have consequently been able to make more satisfactory comparisons of island and mainland birds than has been done heretofore.

The characters of *S. o. pulverius* as given by Grinnell (l. c.), consist, as compared with *S. o. obsoletus*, of notably greater size of bill and feet, and peculiarly yellowish coloration; as given by Ridgway (1904, p. 649), of "larger and relatively stouter bill and much paler, more buffy coloration."

First, as regards the supposed color differences: Grinnell (l. c.) remarks that the "yellowish coloration may be due in part to the bleaching and abrasion of the plumage, but the character is, nevertheless, quite apparent when compared with mainland specimens in correspondingly worn plumage." The ochraceous suffusion remarked upon is truly a conspicuous feature of San Nicolas Island birds in abraded summer plumage, and it is not apparent in any similarly worn examples from the neighboring mainland, but nevertheless it is merely an adventitious acquisition, and one that can *not* be regarded as a specific character. This despite the fact that it could probably be safely used in distinguishing midsummer birds! In a similar manner four of the five adults of *guadeloupensis* at hand, collected in May, are more or less discolored with a reddish suffusion over the entire plumage. This also, it is safe to say, is the result of some peculiarity in surroundings acting directly upon the feathers, and not to be considered as an inherent character of the species.

Four September specimens and one January bird from San Nicolas Island have been carefully compared with corresponding mainland specimens, and I am unable to distinguish the slightest significant difference in color or pattern. Shade and markings of back, breast, flanks, under tail coverts, etc., have been considered separately, and while there is great variation in all these features among birds from any region, I can find no tendency among the San Nicolas Island specimens toward the development of any distinctive color character.

Second, as regards differences of size: As shown in the accompanying table of measurements, *S. o. pulverius* as compared with the mainland *S. o. obsoletus*, has a slightly greater average length of culmen. This difference in culmen length is, I believe, somewhat greater than appears in these tables, especially as regards the females, where, according to the figures, it is not very well marked. Of the six females used in the measurements, four were collected in September. They are in fresh winter plumage, but whether they are adults, a year or more old, or immatures of the previous spring, was not noted by the collector, and there is not now, of course, any way of telling. To ascertain something of the variation by age I measured a small series of mainland birds in first winter plumage, the age determined by condition of the skull, and found the length of culmen appreciably less than in others unquestionably adult. In September collecting many more immatures than adults are taken, and it may well be that most or all of the San Nicolas Island September birds at hand are immatures in first winter plumage. Thus, invaluable as they are for color comparisons, it is possible that these specimens are not to be relied upon to show the true character of the race as regards length of

MEASUREMENTS OF SERIES OF ROCK WRENS

	Wing	Tail	Culmen	Tarsus	Middle toe without claw
<i>Salpinctes o. obsoletus</i> :					
10 adult males, mainland of southern California.	71.8 (68-76.2)	53.4 (50-58)	17.9 (17-19)	21.2 (20-22)	13.9 (13-14.5)
3 adult males, Santa Cruz Island, California.....	72.3 (71.8-72.5)	51.6 (50.2-52.5)	17.2 (16.5-18)	20.7 (20.2-21.5)	13.8 (13-14.5)
2 adult males, San Clemente Island, California...	70.2 (69-71.5)	49.4 (49-49.8)	18 (17.5-18.5)	21.2 (21-21.5)	14.3 (14.2-14.5)
3 adult males, Santa Barbara Island, California...	69.2 (67-72.5)	52.3 (51-53)	17.5 (16.5-18)	20.5 (20-21)	14.1 (13.8-14.2)
1 adult male, Cerros Island, Lower California.....	68.5	50	19	20.5	14
3 adult males, Ildefonso Island, Lower California	70 (68-73)	51.7 (50-53.2)	18.4 (17-19.8)	20.4 (19.5-21.5)	14
<i>Salpinctes o. pulverius</i> :					
6 adult males, San Nicolas Island, California.....	70.4 (67.5-74)	51.1 (49-52.5)	19.2 (18.2-20)	21.9 (21-22.5)	14.1 (14-14.5)
<i>Salpinctes g. guadeloupensis</i> :					
3 adult males, Guadalupe Island, Lower California	64.3 (64-65)	46.8 (46-48)	20.2 (20-20.5)	20.3 (20.2-20.5)	12.5 (12-13)
<i>Salpinctes g. proximus</i> :					
1 adult male, San Martin Island, Lower California	69.5	53.8	20.5	21.5	14
<i>Salpinctes o. obsoletus</i> :					
10 adult females, mainland of southern California	68.6 (67-72)	50.2 (48-53.5)	18.2 (16.8-19)	20.6 (19.8-21.5)	13.8 (13.5-14.5)
3 adult females, Santa Cruz Island, California...	67.4 (66-69.2)	50.8 (49-53.5)	16.9 (16.8-17.2)	20.3 (19.5-21)	13.4 (12.2-14.5)
2 adult females, San Clemente Island, California	68.2 (68-68.5)	50.2 (48.5-52)	17.7 (17.5-18)	20.7 (20-21.5)	13.6 (13.2-14)
1 adult female, Santa Barbara Island, California	68.5	52.5	17.5	20	14.2
1 adult female, Santa Catalina Island, California	67	52	18	20	14
1 adult female, Coronado Islands, Lower California	71	50.5	18	20.8	14
1 adult female, San Benito Island, Lower California	69	50	18.8	21	14
2 adult females, Ildefonso Island, Lower California	67	47.7 (46-49.5)	17.6 (16.8-18.5)	20 (19.8-20.2)	13.9 (13.8-14)
<i>Salpinctes o. pulverius</i> :					
6 adult females, San Nicolas Island, California...	68.1 (66-70)	48.8 (46-50.2)	18.4 (17.5-19.5)	20.7 (19.5-22)	14.4 (13-15.5)
<i>Salpinctes g. guadeloupensis</i> :					
2 adult females, Guadalupe Island, Lower California	64.7 (64.5-66)	47 (44.5-49.5)	21.1 (20.5-21.8)	20.6 (20.5-20.8)	12.9 (12.8-13)

culmen. No mainland bird was found with length of culmen equal to the maximum of San Nicolas Island specimens.

Twenty-two examples of *pulverius* in juvenal plumage are quite indistinguishable from young birds from the mainland. There is not the slightest tendency toward the development of any differential features at this stage, such as are so conspicuous in the young *Salpinctes guadeloupensis*.

To sum up, it seems apparent that the only distinctive feature of the San Nicolas Island Rock Wren is the slightly greater average length of culmen. In neither adults nor young are there any characters of color or markings not included in the range of variation found in the mainland bird. It seems advisable to recognize the slight size difference shown in the island series by the use of a separate name, *pulverius*, as has been done, but the name should be restricted to the birds from San Nicolas Island. Specimens at hand from others of the Santa Barbara Islands in every respect fall within the range of variation of *S. obsoletus obsoletus*.

In the spring of 1912 Mr. George Willett made a small collection of birds on certain of the islands off the coast of northwestern Lower California. These form part of his collection now on deposit at the Los Angeles Museum of History, Science and Art. Among the specimens collected on this trip is a single adult Rock Wren from San Martin Island; and it is rather startling to find that this bird is radically different in appearance from the mainland *Salpinctes obsoletus*, and but slightly distinguished from *S. guadeloupensis*. This wren I propose to call:

***Salpinctes guadeloupensis proximus*, new subspecies**
San Martin Island Rock Wren

Type.—Adult male; San Martin Island, Lower California; April 10, 1912; collected by George Willett; original number 1150.

Characters.—In coloration most nearly like *S. guadeloupensis guadeloupensis*. Dark brown, as in that race, and with the back rather heavily barred. The most apparent color difference between the forms is that in *proximus* the outer webs of the tertials, secondaries, and some of the primaries, are rather conspicuously barred, as in some examples of *obsoletus*, while in the five adults at hand from Guadalupe Island, they are almost or quite uniform. As regards measurements, *proximus* has the long, heavy bill of *guadeloupensis*. It has not the relatively short wing and tail of the latter race, but in these measurements is more nearly like the mainland form.

Remarks.—It is not without reluctance that I have decided to attach a name to this supposed island race, for I am aware of the objections that might be made to such a course. San Martin is only about six miles from the mainland. It is of small size, its area comprising but a few square miles, and it is at a comparatively remote distance from Guadalupe. However, similar apparent anomalies in distribution are known among other animals of insular distribution on the Pacific coast of North America; and, conceding the peculiarities of range and the limited material available, this single specimen still hardly admits of any other treatment. Its characteristics are absolutely unlike *S. obsoletus*, and point as definitely toward *guadeloupensis* in affinities. This is the more striking in consideration of the uniformly *obsoletus*-like character of the Rock Wrens of other islands, some near and some remote from San Martin.

It may be urged that it is sufficient to point out the peculiarities of such a specimen, without attaching a new name to it, but it is doubtful if such procedure emphasizes the case sufficiently. In depending upon research and collecting in the future it is far more likely that a definite "type locality"

will attract attention, than that a statement of probable affinities will be remembered from one out of a mass of papers.

Although it is of course a matter of regret that there is but one specimen of this island subspecies at hand, I believe that the appearance of this single bird justifies the naming of the race to which it belongs. Although there is great variation shown in series of *Salpinctes obsoletus*, both as regards shades of gray or brown, and character of spots, bars, or streaks, on various parts of the plumage, this specimen stands absolutely outside of this range of variation, so that I do not believe that there is any question of its belonging to this species. From *guadeloupensis* it is not so readily distinguished, at least as regards color, but the measurements lie outside the limits reached by that form. As in its variation from typical *guadeloupensis* there is an apparent approach toward the characters of *obsoletus*, it might be considered as illustrating intergradation between the two, but for the present at least, in view of the many peculiarities of distribution observed in the genus, it seems best to consider *obsoletus* and *guadeloupensis* as distinct species.

We are probably safe in assuming that the Rock Wrens of all the islands off the coast of California, as well as those of most of the Lower California islands, are derived from the mainland form *Salpinctes obsoletus*. In fact, in most cases they are not to be distinguished, though it does seem to me that in the island birds throughout there is to be detected a slight general tendency toward lengthening of culmen. In the Santa Barbara group this tendency has reached, on San Nicolas, most remote from the mainland, a stage where we are perhaps justified in recognizing the variation in nomenclature, and considering the San Nicolas Rock Wren as a separate subspecies. There is another slightly differentiated island form of *obsoletus*, *S. o. exsul* (not seen by me), from San Benedicto Island, of the Revillagigedo group, off the coast of western Mexico. Of additional island localities there are at hand specimens from most of the Santa Barbara islands, and from the following Lower California islands: The Coronados, San Benito, Cerros and Ildefonso. None of these are to be distinguished with certainty from typical *S. obsoletus*.

Thus there is on the mainland coast of California and Lower California, and on most of the adjacent islands, the Rock Wren, *Salpinctes obsoletus*, in its three very slightly distinguished races, *obsoletus*, *pulverius* and *exsul*. In the midst of this general range there is found on two islands, Guadalupe and San Martin, a sharply differentiated form, *Salpinctes guadeloupensis*, apparently divided into two races, *guadeloupensis* and *proximus*. Bearing in mind the above facts as regards distribution, and also the degree and kinds of difference distinguishing the forms, it seems to me that in the light of our present limited knowledge of the subject, it is best to regard *Salpinctes obsoletus* and *S. guadeloupensis*, as distinct species, the first composed of several, the second of two, different forms or subspecies. In other words, it is the treatment accorded these forms in the A. O. U. *Check-List* (1910, p. 336) that seems to me the more reasonable, rather than the view expressed by Ridgway (1904, pp. 643-653) in his recent study of the group. At the same time recognition must be accorded the possible significance of the peculiar juvenal plumage of *Salpinctes obsoletus notius* (not seen by me). In this Mexican form the young is described by Ridgway (1904, p. 648, footnote) as being similar to the corresponding stage of *guadeloupensis*, and this may be an indication of close relationship between these two forms, though the geographical position of *notius* adds no emphasis to such a theory. The

southern Mexican and Central American forms of this genus are so imperfectly known and understood, however, that any general treatment of the genus must be at this time regarded as tentative, and for the present it seems best to consider *obsoletus* and *guadeloupensis* as specifically distinct.

Specimens examined.—*Salpinctes o. obsoletus*: Nevada, 22; Arizona, 18; Oregon, 1. Mainland of California: Modoc County, 17; Amador County, 1; El Dorado County, 1; Alameda County, 2; Tehama County, 2; Kern County, 9; Tulare County, 2; Fresno County, 1; Ventura County, 2; Los Angeles County, 46; San Bernardino County, 30; Riverside County, 13; San Diego County, 1; Colorado River between Needles and Yuma, 9. Island localities: San Clemente Island, 4; Santa Catalina Island, 2; Santa Barbara Island, 8; Santa Cruz Island, 6; San Miguel Island, 2; Coronado Islands, Lower California, 5; San Benito Island, Lower California, 1; Cerros Island, Lower California, 1; Idefonso Island, Lower California (east coast), 6. *Salpinctes o. pulverius*: San Nicolas Island, California, 34 (12 adults, 22 juveniles). *Salpinctes g. guadeloupensis*: Guadalupe Island, Lower California, 6 (5 adults, 1 juvenile). *Salpinctes g. proximus*: San Martin Island, Lower California, 1 adult. Total number of specimens, 253.

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A SURVEY OF THE BREEDING GROUNDS OF DUCKS IN CALIFORNIA IN 1914

By HAROLD C. BRYANT

WITH NINE PHOTOGRAPHS BY THE AUTHOR

(Contribution from the University of California Museum of Vertebrate Zoology*)

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